

MDSC-2226

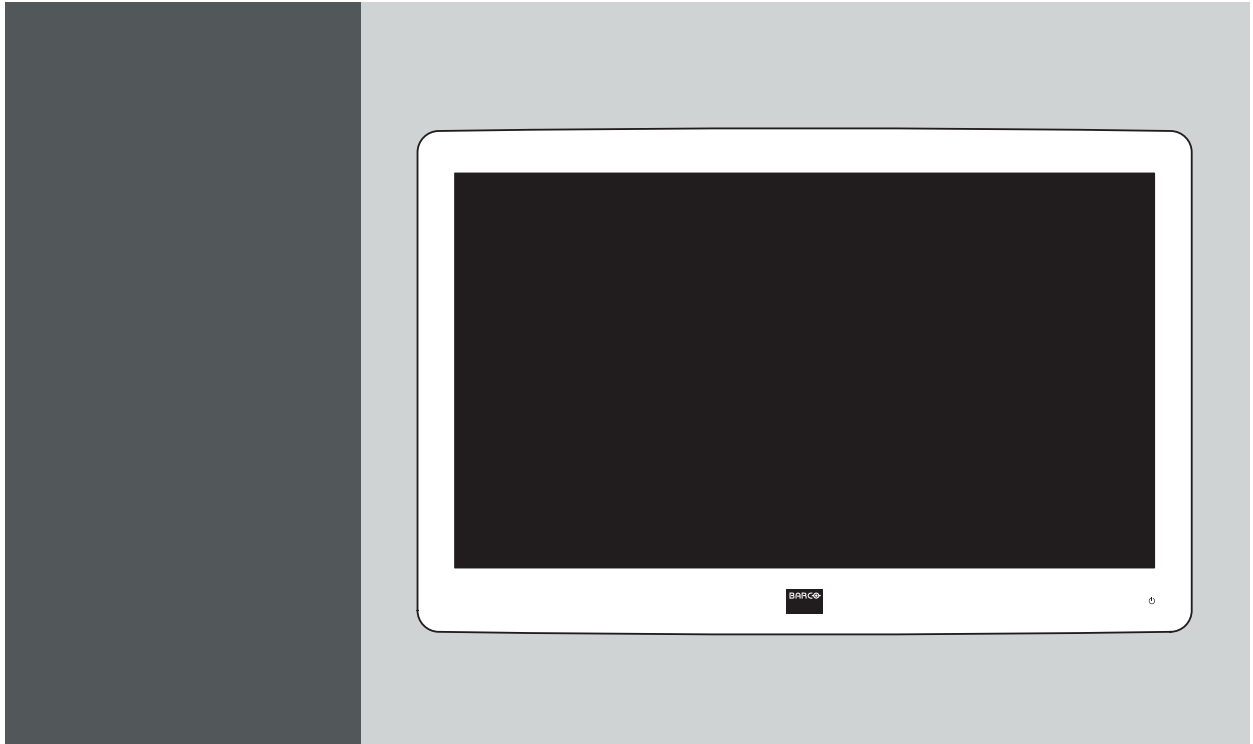
User Guide



BARCO

Visibly yours

MDSC-2226



User Guide

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1. WELCOME!

1.1 About the product

Overview

Barco's MDSC-2226 is a 26-inch surgical display. Purpose-built for the operating room, the MDSC-2226 offers an easy-clean design, smart mechanics and the most detailed images in the operating room today.

Ease of mind

Perfect hand-eye coordination: The display's high brightness, high contrast and full HD resolution provide surgeons with excellent depth perception and the most accurate images. The MDSC-2226 presents images with unrivaled color and grayscale accuracy and with near-zero latency, making it perfectly suited for use with today's state-of-the-art endoscopy camera systems.

Multi-source, multi-display imaging: With its broad input connectivity, the MDSC-2226 also offers flexible multi-modality imaging (PiP & PaP) in new integrated operating rooms. Thanks to its high-bright LED backlight, the surgical display also ensures a long lifetime and low power consumption.

Ease of installation

The MDSC-2226 comes with a smart cable management system that hides the cables for a clutter-free set-up. Its lightweight design allows easy mounting on surgical booms and spring arms. Available in three models, this surgical display also features a host of connectivity options and remote control.

Ease of use

Barco's MDSC-2226 allows easy cleaning and complete disinfection thanks to its smooth surface, sealed housing, and protective screen cover. The fanless design avoids the spread of contaminants.

Features






- 26-inch wide-screen LCD with full HD resolution and 10-bit per color
- Wide viewing angle
- High-brightness LED backlight
- Backlight Output Stabilization (BLOS)
- Advanced, full 10-bit image processing algorithms with 12-bit LUT
- Widest range of SD and HD input signals, including 3G-SDI and DisplayPort
- Light weight to easily mount onto a boom

Innovative features are also available to give maximum flexibility when installing the display as: Configurable DVI-out and Failover Mode

1.2 Symbols

Overview

The following icons are used in the manual :

	Caution
	Warning
	Info, term definition. General info about the term
	Note: gives extra information about the described subject
	Tip: gives extra advice about the described subject

1.3 What's in the box

Overview

Your MDSC-2226 display comes with:

- MDSC-2226 user guide
- DVI cable
- AC power cords
- external power supply
- 4 screws and Allen key



Keep your original packaging. It is designed for this display and is the ideal protection during transport.

1.4 About this user guide

Overview

This manual provides a support to the user during the installation, set up and utilization of the MDSC-2226 display. Depending on the specific version that has been purchased, some of the features and options described in this document may not apply to the display in user's hands.

2. PARTS, CONTROLS AND CONNECTORS

2.1 Front view

Overview

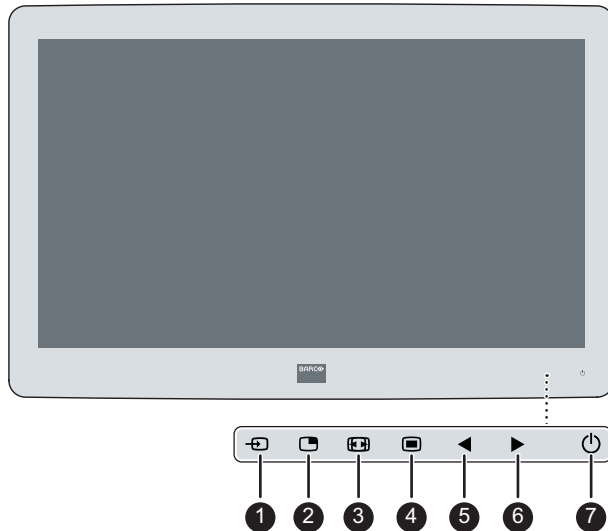


Image 2-1

①	Input Selection key
②	Multi-image selection key / Down key
③	Image zoom key / Up key
④	OSD Menu key / Enter key
⑤	Brightness decrease / Left key
⑥	Brightness increase / Right key
⑦	Stand-by key

A 7-key capacitive keypad is located on the front of the display. By default only the stand-by key is visible. When you touch any of the keys shortly, the front illumination of all other keys is switched on for a few seconds. When you touch any of these other keys again while the illumination is on, the function of the key is executed. If no further action is taken within the time-out, the front key illumination is switched off again.



The auto-dim function of the front key illumination can be disabled in the OSD menu.

2.2 Rear view

Overview

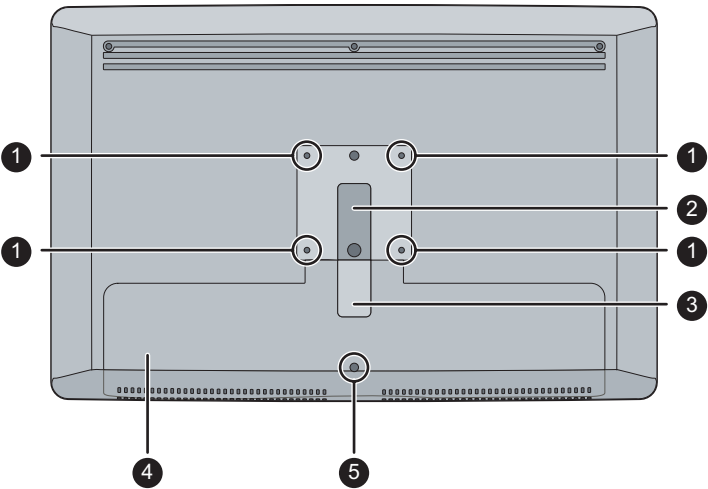


Image 2-2

1	VESA mount screw holes
2	Cable routing channel
3	Cable routing channel expansion clip
4	Connector compartment cover
5	Connector compartment cover fixation screw

2.3 Connector view

2.3.1 MDSC-2226 LED version

Overview

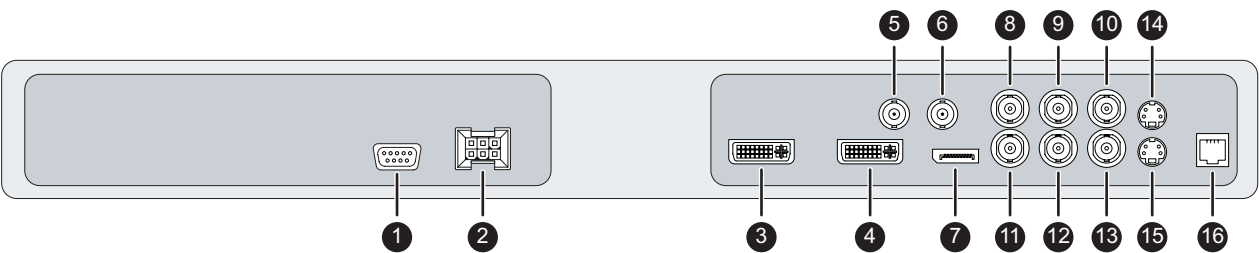


Image 2-3

1	RS232
2	Input power connector
3	DVI out
4	DVI-1 (digital & analog – HDMI video support with HDCP)
5	SDI-1 out
6	SDI-1
7	DisplayPort (VESA std 1.1a)
8	Sync
9	CVBS

10	CVBS out
11	R/Pr
12	G/Y
13	B/Pb
14	S-Video out
15	S-Video
16	Service

2.3.2 MDSC-2226 DDI version

Overview

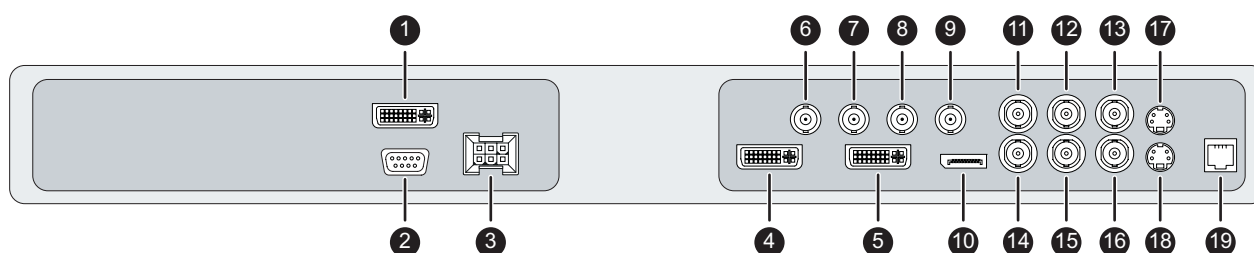


Image 2-4

1	DVI-2
2	RS232
3	Input power connector
4	DVI out
5	DVI-1 (digital & analog – HDMI video support with HDCP)
6	SDI-2 out
7	SDI-2
8	SDI-1 out
9	SDI-1
10	DisplayPort (VESA std 1.1a)
11	Sync
12	CVBS
13	CVBS out
14	R/Pr
15	G/Y
16	B/Pb
17	S-Video out
18	S-Video
19	Service

2.3.3 MDSC-2226 MNA version

Overview

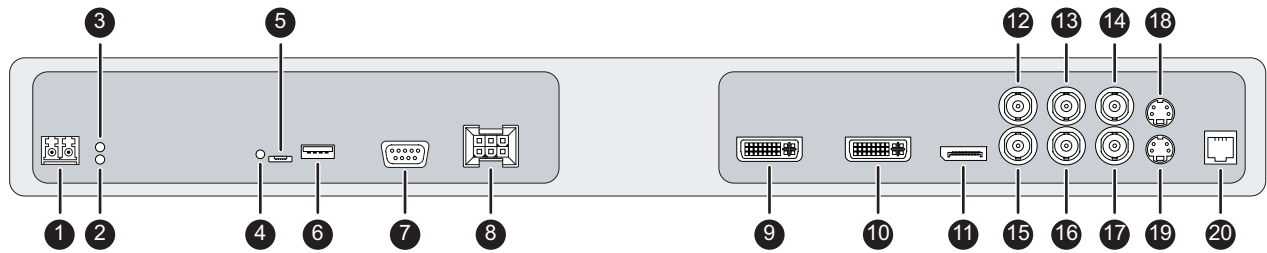


Image 2-5

1	Optical 10Gb Ethernet SFP+ interface*
2	LED2* Orange blinking: Activity = (Tx) or (Rx) Off: No network activity
3	LED1* Green: Link is active Off: No active network connection
4	LED3* Green: Power on, normal operation Off: System not powered Orange blinking: Error
5	Micro USB interface*
6	USB 2.0 type A interface*
7	RS232
8	Input power connector
9	DVI out
10	DVI-1 (digital & analog – HDMI video support with HDCP)
11	DisplayPort (VESA std 1.1a)
12	Sync
13	CVBS
14	CVBS out
15	R/Pr
16	G/Y
17	B/Pb
18	S-Video out
19	S-Video
20	Service

(*) Nexxis OR functionality: for more detailed information please refer to the dedicated user guides. Please visit my.barco.com to obtain these user guides.

2.4 Connector pin assignments

2.4.1 Input power connector

Overview

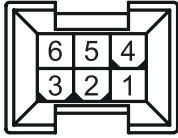


Image 2-6

Pin	Function
1	GND
2	Not connected
3	+24 VDC
4	GND
5	Shield
6	+24 VDC



The ground and the shield connections on the power input connector have no Protective Earth function. A Protective Earth connection is provided via a dedicated pin (see image 3-10).

2.4.2 DVI–1 connector

Overview

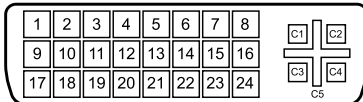


Image 2-7

Pin	Function
1	D2_Rx- (T.M.D.S.)
2	D2_Rx+ (T.M.D.S.)
3	GND (data 2 shield)
4	Not connected
5	Not connected
6	SCL (for DDC)
7	SDA (for DDC)
8	Analog vertical sync
9	D1_Rx- (T.M.D.S.)
10	D1_Rx+ (T.M.D.S.)
11	GND (data 1 shield)
12	Not connected
13	Not connected
14	+5V input (DDC supply) (*)
15	GND (cable sense)

2. Parts, controls and connectors

16	Hot plug detect (*)
17	D0_Rx- (T.M.D.S.)
18	D0_Rx+ (T.M.D.S.)
19	GND (data 0 shield)
20	Not connected
21	Not connected
22	GND (clock shield)
23	CK_Rx+ (T.M.D.S.)
24	CK_Rx- (T.M.D.S.)
C1	Analog Red
C2	Analog Green
C3	Analog Blue
C4	Analog horizontal sync
C5	Analog GND return (analog R, G, B)

(*) +5 VDC output selectable on either pin 14 or 16 via the OSD menu.

2.4.3 DVI-2 connector

Overview

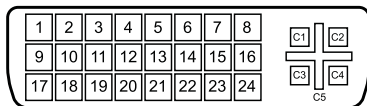


Image 2-8

Pin	Function
1	D2_Rx- (T.M.D.S.)
2	D2_Rx+ (T.M.D.S.)
3	GND (data 2 shield)
4	Not connected
5	Not connected
6	SCL (for DDC)
7	SDA (for DDC)
8	Not connected
9	D1_Rx- (T.M.D.S.)
10	D1_Rx+ (T.M.D.S.)
11	GND (data 1 shield)
12	Not connected
13	Not connected
14	+5V input (DDC supply) (*)
15	GND (cable sense)
16	Hot plug detect (*)
17	D0_Rx- (T.M.D.S.)
18	D0_Rx+ (T.M.D.S.)
19	GND (data 0 shield)
20	Not connected
21	Not connected

22	GND (clock shield)
23	CK_Rx+ (T.M.D.S.)
24	CK_Rx- (T.M.D.S.)

(*) +5 VDC output selectable on either pin 14 or 16 via the OSD menu.

2.4.4 DVI out connector

Overview

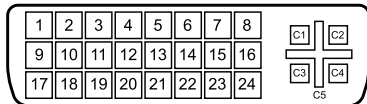


Image 2-9

Pin	Function
1	D2_Rx- (T.M.D.S.)
2	D2_Rx+ (T.M.D.S.)
3	GND (data 2 shield)
4	Not connected
5	Not connected
6	SCL (for DDC)
7	SDA (for DDC)
8	Not connected
9	D1_Rx- (T.M.D.S.)
10	D1_Rx+ (T.M.D.S.)
11	GND (data 1 shield)
12	Not connected
13	Not connected
14	+5V output
15	GND (cable sense)
16	Hot plug detect
17	D0_Rx- (T.M.D.S.)
18	D0_Rx+ (T.M.D.S.)
19	GND (data 0 shield)
20	Not connected
21	Not connected
22	GND (clock shield)
23	CK_Rx+ (T.M.D.S.)
24	CK_Rx- (T.M.D.S.)

2.4.5 RS232 connector

Overview

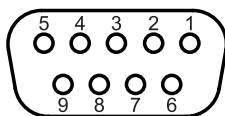


Image 2-10

2. Parts, controls and connectors

Pin	Function
1	Not connected
2	Rx (driven by host)
3	Tx (driven by display)
4	Not connected
5	Ground
6	Not connected
7	Not connected
8	Not connected
9	Not connected

2.4.6 USB connector

Overview

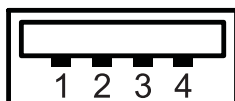


Image 2-11

Pin	Function
1	+5 VDC
2	Data —
3	Data +
4	GND

2.4.7 Mini USB connector

Overview

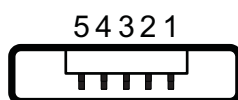


Image 2-12

Pin	Function
1	+5 VDC
2	Data —
3	Data +
X	Not connected
4	GND

2.4.8 DisplayPort connector

Overview

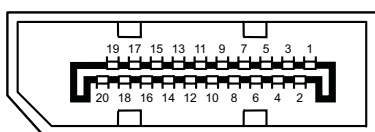


Image 2-13

Pin	Function
1	ML_Lane 0 (p)
2	GND
3	ML_Lane 0 (n)
4	ML_Lane 1 (p)
5	GND
6	ML_Lane 1 (n)
7	ML_Lane 2 (p)
8	GND
9	ML_Lane 2 (n)
10	ML_Lane 3 (p)
11	GND
12	ML_Lane 3 (n)
13	CONFIG1
14	CONFIG2
15	AUX CH (p)
16	GND
17	AUX CH (n)
18	Hot Plug
19	Return
20	DP_PWR (+3.3 VDC)

2.4.9 S-Video and S-Video-out connector

Overview

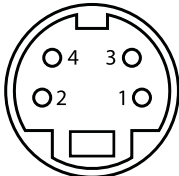


Image 2-14

Pin	Function
1	Ground (Y)
2	Ground (C)
3	Luminance (Y)
4	Chroma (C)
SG	Shielded Ground

3. DISPLAY INSTALLATION

3.1 VESA mount installation

Overview

The display supports arm stands according to the VESA 100 mm standard.



CAUTION: Use an arm that is approved by VESA.



CAUTION: Use an arm that can support a weight of least 10 kg (22,05 lbs).

The monitor VESA interface has been designed for a safety factor 6 (to support 6 times the monitor weight). In the medical system, use an arm with suitable safety factor (IEC60601-1).

To mount the display to an arm stand

1. Attach the arm stand **firmly** to the panel using the included 4 hexagonal screws (M4 x 25 mm) and the dented washers. Use the included Allen key to fix the screws.

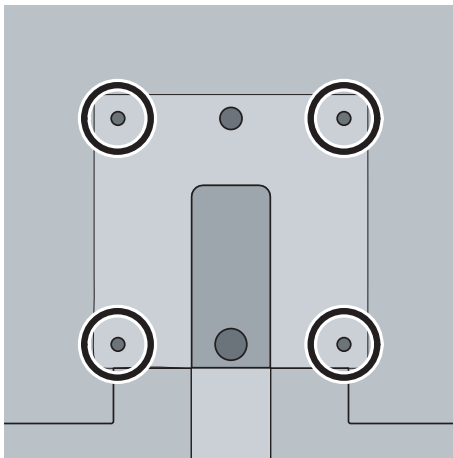


Image 3-1



CAUTION: The 4 screws included with this display (M4 x 25 mm) can be used for an external VESA arm interface with a thickness of up to 5mm.

If, due to the thickness of the external VESA arm interface (=V), the length of the provided screws (=L) is not suitable, consider the following rule:

$$L_{\min} = V + 20\text{mm}$$

$$L_{\max} = V + 30\text{mm}$$

3.2 Cover removal

To remove the connector compartment cover

1. Loosen the screw fixing the connector compartment cover.
2. Slide the cover downwards to remove it from the display.

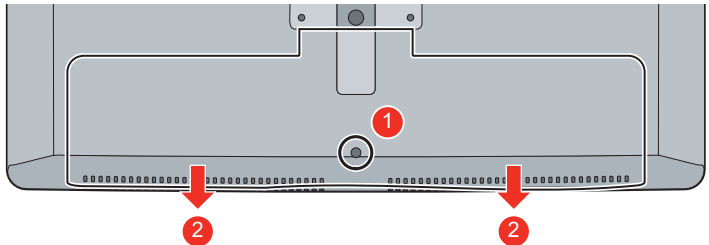


Image 3-2

3.3 Video input connection

About video input connections

The MDSC-2226 can have multiple different video inputs connected (depending on the display version). Switching between the different inputs can be easily done by pressing the direct access key for this. See the dedicated section for more info.

Futhermore, if more than one video source is connected, the Picture in Picture (PiP) and Side-by-Side (SbS) functionality becomes available, allowing you to view two different video inputs at once. Please refer to the dedicated chapter for more info on how to activate and use the PiP and SbS features on your MDSC-2226.

This chapter describes how to connect the different video input types for each version of the MDSC-2226.

3.3.1 MDSC-2226 LED version

To connect the video inputs

1. Connect one or more of the available video source(s) to the corresponding video inputs using the appropriate video cable(s).

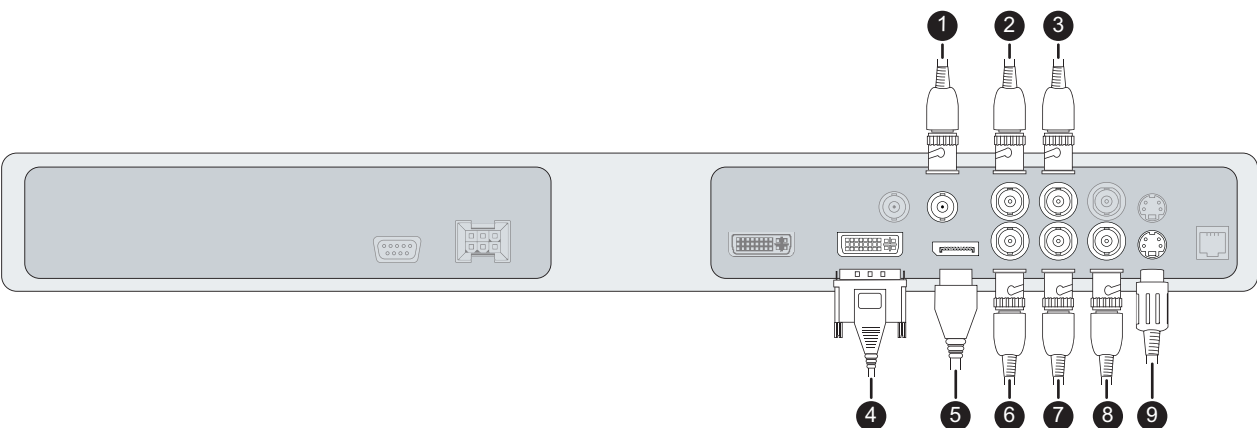


Image 3-3

DVI or VGA (*)	4
DisplayPort	5

SDI	①
R/G/B/S	⑥ / ⑦ / ⑧ / ②
R/G/B (SOG)	⑥ / ⑦ / ⑧
Y/Pb/Pr	⑦ / ⑧ / ⑥
CVBS	③
S-Video	⑨

(*) PC analog (VGA) input source can be connected to the DVI-I input connector using a DVI-I to VGA adapter. The use of an adapter cable of at least 0.15 m long will allow an easy placement inside the cable cover.

3.3.2 MDSC-2226 DDI version

To connect the video inputs

1. Connect one or more of the available video source(s) to the corresponding video inputs using the appropriate video cable(s).

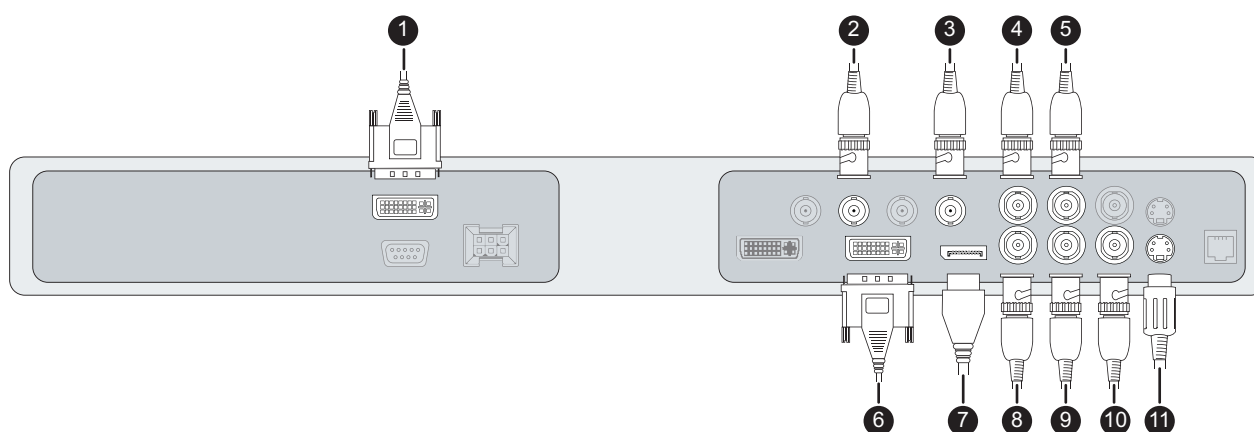


Image 3-4

DVI 1 or VGA (*)	⑥
DVI 2	①
DisplayPort	⑦
SDI 1	③
SDI 2	②
R/G/B/S	⑧ / ⑨ / ⑩ / ④
R/G/B (SOG)	⑧ / ⑨ / ⑩
Y/Pb/Pr	⑨ / ⑩ / ⑧
CVBS	⑤
S-Video	⑪

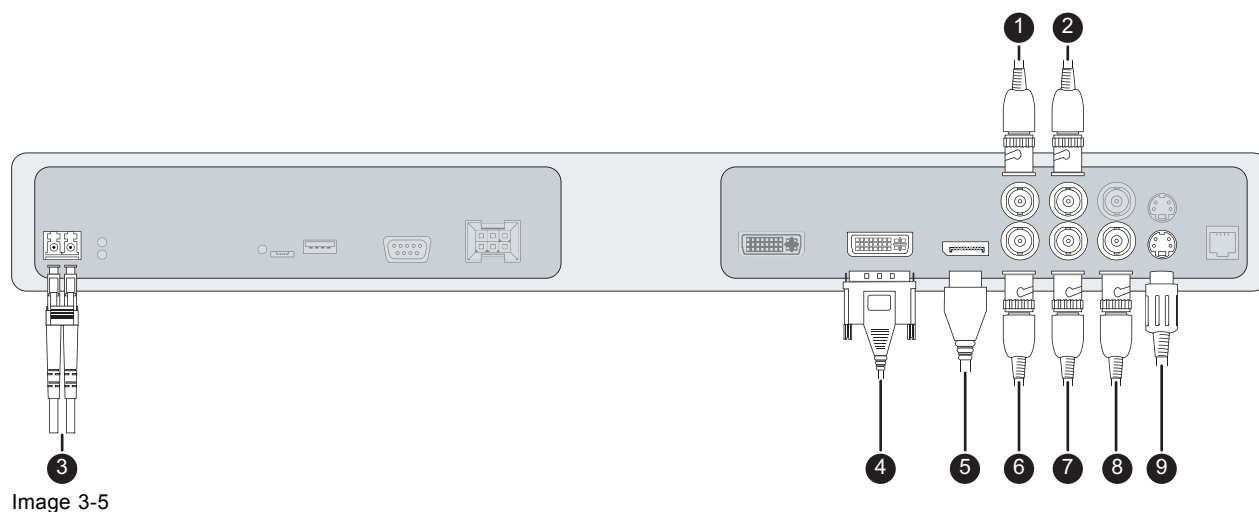
(*) PC analog (VGA) input source can be connected to the DVI-I input connector using a DVI-I to VGA adapter. The use of an adapter cable of at least 0.15 m long will allow an easy placement inside the cable cover.

3.3.3 MDSC-2226 MNA version

To connect the video inputs

1. Connect one or more of the available video source(s) to the corresponding video inputs using the appropriate video cable(s).

3. Display installation



Nexxis	3
DVI or VGA (*)	4
DisplayPort	5
R/G/B/S	6 / 7 / 8 / 1
Y/Pb/Pr	7 / 8 / 6
CVBS	2
S-Video	9

(*) PC analog (VGA) input source can be connected to the DVI-I input connector using a DVI-I to VGA adapter. The use of an adapter cable of at least 0.15 m long will allow an easy placement inside the cable cover.

3.4 Video output connection

About video output connections

Beside the video input connections, the MDSC-2226 also has video output capabilities allowing you to loop-through certain video inputs connected with the MDSC-2226 to another display, projector, video recorder, ...

This chapter describes how to make use of the video output connections available for each version of the MDSC-2226.

3.4.1 MDSC-2226 LED version

To connect the video outputs

1. Connect one or more of the available video sink(s) to the corresponding video outputs using the appropriate video cable(s).

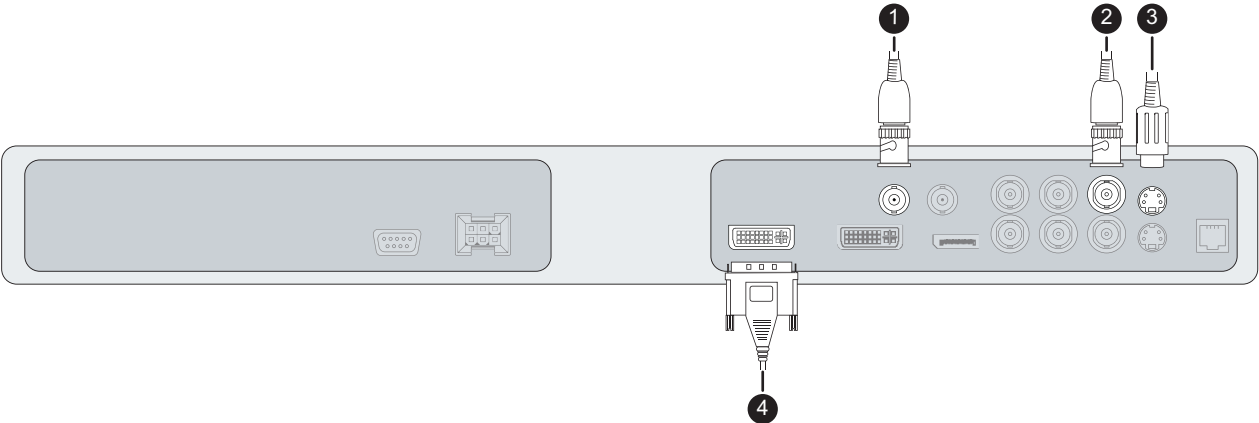


Image 3-6

SDI	1
CVBS	2
S-Video	3
DVI	4 (to be configured in OSD menu)

3.4.2 MDSC-2226 DDI version

To connect the video outputs

1. Connect one or more of the available video sink(s) to the corresponding video outputs using the appropriate video cable(s).

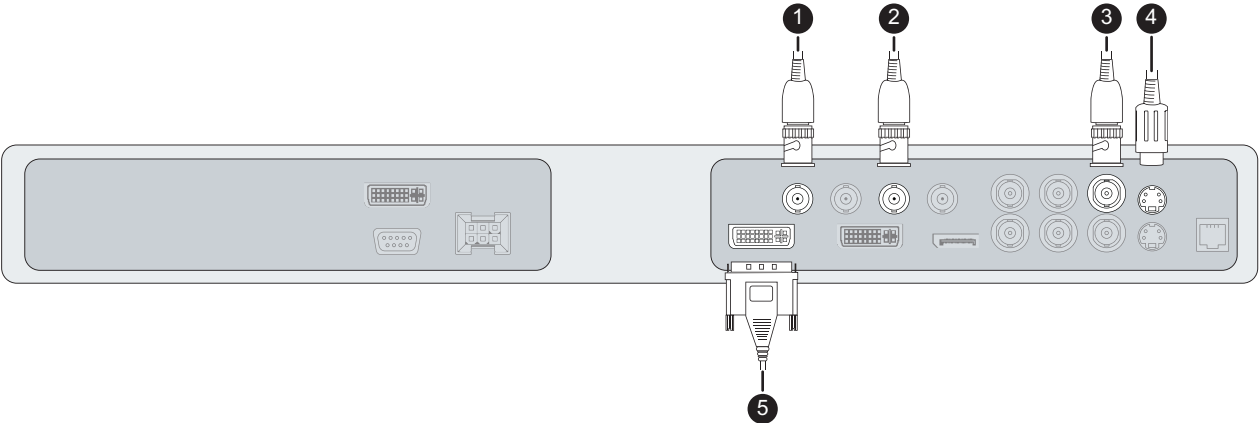


Image 3-7

SDI 1	2
SDI 2	1
CVBS	3
S-Video	4
DVI 1 or DVI 2	5 (to be configured in OSD menu)

3. Display installation

3.4.3 MDSC-2226 MNA version

To connect the video outputs

1. Connect one or more of the available video sink(s) to the corresponding video outputs using the appropriate video cable(s).

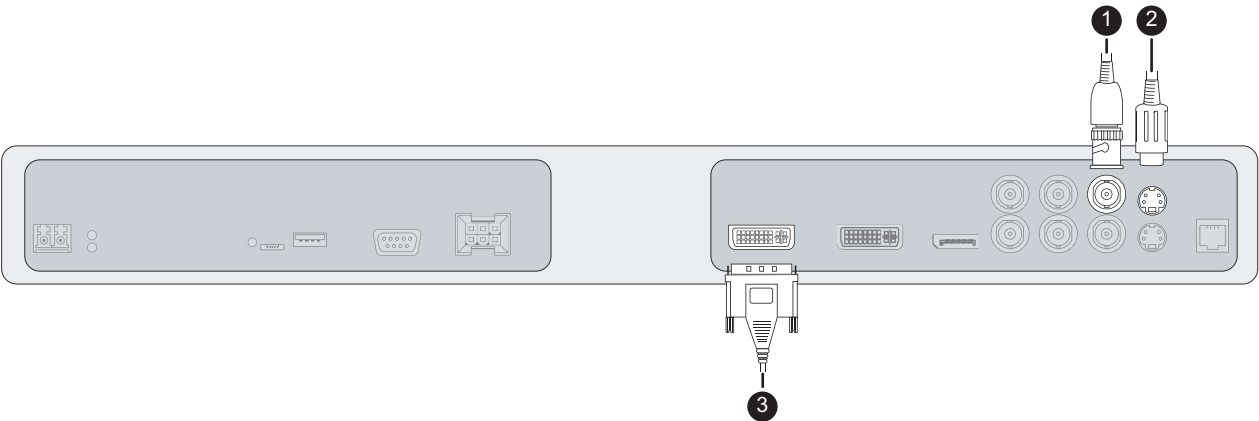


Image 3-8

CVBS	①
S-Video	②
DVI	③ (to be configured in OSD menu)
Nexxis	③ (to be configured in OSD menu)

3.5 Nexxis OR

Overview

Connecting your MDSC-2226 to Barco's Nexxis OR system allows you to distribute video, graphics, audio and computer data over the IP network, in raw uncompressed format, inside the operating room and even between surgical suites.

To connect your MDSC-2226 to Barco's Nexxis OR system, connect the 10Gb Ethernet interface to your Nexxis switch. More info about Nexxis OR and how to configure the MDSC-2226 in your network is available in the dedicated user guides. Please visit my.barco.com to obtain these user guides.



Nexxis OR is only available on the MDSC-2226 MNA version.

3.6 Power supply connection

To connect the power supply

1. Connect the supplied external DC power supply unit to the +24 VDC power input of your MDSC-2226 display.

2. Plug the other end of the external DC power supply into a **grounded** power outlet by means of the proper power cord delivered in the packaging.

Note: The ground and the shield connections on the power input connector have no Protective Earth function. A Protective Earth connection is provided via a dedicated pin (see image 3-10).

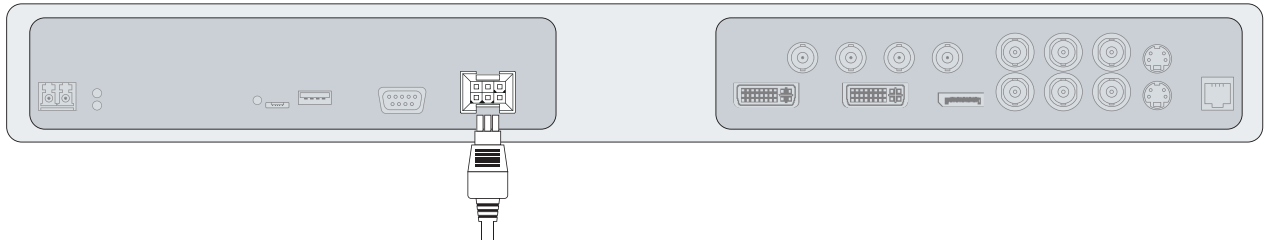


Image 3-9

Protective earth pin

1. Earth the MDSC-2226 by connecting the protective earth pin to a grounded outlet by means of an AWG18 (max. 6ft / 1,8m long) wire.

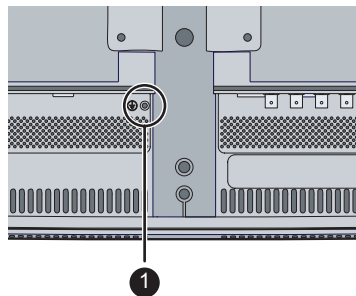


Image 3-10

3.7 Cable routing

To route the cables

1. For displays mounted to a VESA arm with internal cable routing provisions, route all cables through the cable routing channel, then reinstall the connector compartment cover.

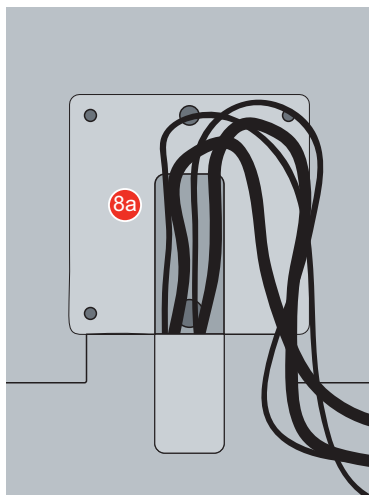


Image 3-11

3. Display installation

Or,

For all other mounting options, remove the cable routing channel expansion clip from the connector compartment cover and route all cables through it while reinstalling the cover.

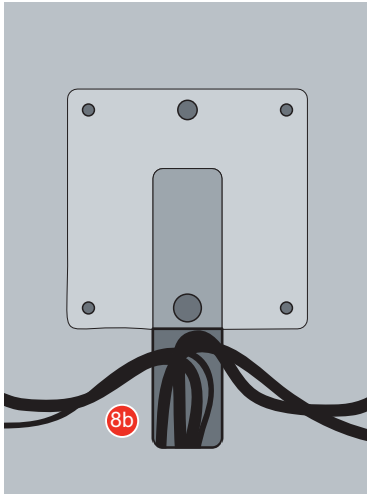


Image 3-12



WARNING: When the display is assembled in the medical system, take care of the anchorage of all cables, to avoid unwanted detachment.

4. DAILY OPERATION

4.1 Keyboard backlight

About the keyboard backlight


By default only the stand-by key is visible. When you touch any of the keys shortly, the backlight of all other keys is switched on for a few seconds. When you touch any of these keys again while the backlight is on, the function of the key is executed. If no further action is taken within the time-out, the keyboard backlight is switched off again.



The keyboard backlight auto-dim function can be disabled in the OSD menu so that the keyboard backlight is always on (*Keyboard Backlight*).

4.2 On/Off switching


To switch on your display:

1. Activate the power supply through the switch located on the external power supply.
2. While your display is off, press and hold the stand-by key  for approximately 3 seconds.



To minimize the power consumption, also the external power supply has to be switched off.

To switch off your display:



1. While your display is switched on, press and hold the stand-by key  for approximately 3 seconds.



While pressing the stand-by key to switch off the display, the front key illumination will blink.

4.3 OSD menu activation

To activate the OSD menu

1. If not already done so, switch on the display by pressing and holding the stand-by key  for approximately 3 seconds.
2. Switch on the front key illumination.
3. Touch the Menu/Enter key .

As a result, the OSD main menu comes up in the bottom right corner of the screen. If no further actions are taken within the following 30 seconds, the OSD menu will disappear again.



The time-out of the OSD menu automatic close function can be adjusted or disabled in the OSD menu (*OSD Time-out*).



The OSD menu position can be adjusted in the OSD menu (*OSD Hor. Pos.* and *OSD Vert. Pos.*).

4.4 OSD menu navigation

OSD menu structure explained

Below is an example of how the OSD menu structure looks like:

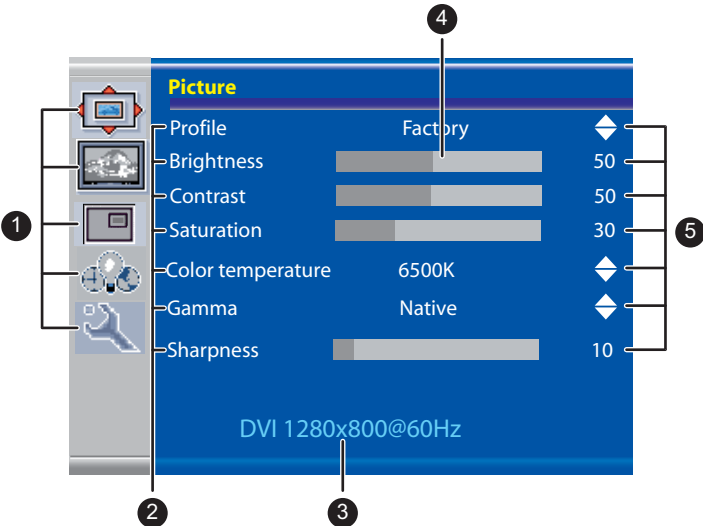


















Image 4-1

1	Menu
2	Sub-menu
3	Status bar
4	Selector/Slider
5	Item

To navigate through the OSD menu



Image 4-2

- Press the  key to open the OSD menu.
- Use the  or  key to scroll to the desired menu page.
- When the desired Menu page is highlighted, press the  key to select the top menu item that will be highlighted.
- Use the  or  keys to move to other Menu Items, then press the  key to select it.
- If the selected menu item is controlled by a slider use the  or  keys to adjust the item value, then press the  key to confirm.
- If the selected menu item is a multiple choices menu use the  or  keys to select the desired option then press the  key to confirm.
- Press again  or  key to select other Menu items or exit from the Menu page by pressing the  key.

4.5 Shortkey functions

About shortkey functions

The concept of shortkey functions is to present a selection of commonly used functions immediately available without the need to navigate through the OSD Menu.

The different available shortkey functions are:

- Main source selection
- Multi-image configuration
- Zoom factor selection
- Brightness adjustment



Unlike the extended keyboard functions (described in next chapter), the shortkey functionality is immediately available without the need to first enable this in the OSD menu.



When the extended keyboard functionality is enabled, all the shortkey functions described below (except for the brightness adjustment), will no longer be available and will be replaced by the corresponding extended keyboard functions described in the next chapter.

Overview of shortcuts

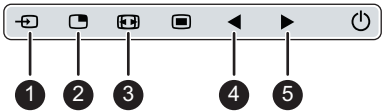


Image 4-3

1	Main source selection
2	Multi-image configuration
3	Zoom factor selection
4	Brightness decrease
5	Brightness increase

4.5.1 Main source selection

To quickly select the main source

1. Use the Input selection key (⏏) to scroll through all the possible input signals to select the main input source.



Available main source options dependent on display model.



When the extended keyboard functionality is enabled, this shortcut functions will no longer be available and will be replaced by the corresponding extended keyboard functions described in the next chapter.

4.5.2 Multi-image configuration

To quickly select the multi-image configuration

1. Use the PiP selection key (⏏) to scroll through all possible configurations of Picture-in-Picture (PiP) and Side-by-Side (SbS).

The different PiP/SbS options are:

- Small PiP: 30% of Primary height in top-right corner
- Large PiP: 50% of Primary height in top-right corner
- Side-by-Side: Primary and Secondary input of equal height



Only a subset of multi-image configuration settings is available via this shortcut function. More multi-image configuration settings can be selected in the OSD menus.



When the extended keyboard functionality is enabled, this shortcut functions will no longer be available and will be replaced by the corresponding extended keyboard functions described in the next chapter.

4.5.3 Zoom factor selection

To quickly select the zoom factor

1. Use the Image zoom key (⏏) to select one of the available zoom factors.



When the extended keyboard functionality is enabled, this shortcut functions will no longer be available and will be replaced by the corresponding extended keyboard functions described in the next chapter.

4.5.4 Brightness adjustment

To quickly adjust the brightness

1. While no OSD Menu is on the screen, press the Brightness decrease (◀) or Brightness increase (▶) keys to adjust the brightness as desired.



Image 4-4



When the extended keyboard functionality is enabled, this shortkey functions will remain available.

4.6 Extended keyboard functions

About extended keyboard functions

The concept of the extended keyboard is to present a large selection of functions immediately available to the user without the need to navigate through the OSD Menu.

Once enabled, by simply pressing one of the first 3 keys on the left the user is presented with a list of new selections displayed on screen; the new choices can be selected by using each of the key just below the OSD text.

If two options are available for one key, the first key press will select the upper option, a second press selects the lower option.

The different available extended keyboard functions are:

- Main source selection
- Second source selection
- Multi-image configuration
- Color temperature selection
- Image size selection
- Zoom factor selection



Unlike the shortkey functions (described before), the extended keyboard functionality must be first enabled in the OSD menu before you can make use of it. Please refer to the dedicated section in this manual for more details on how to enable/disable the extended keyboard functions.



When the extended keyboard functionality is enabled, all the shortkey functions described in previous chapter (except for the brightness adjustment), will no longer be available and will be replaced by the corresponding extended keyboard functions described below.

Overview of extended keyboard



Image 4-5

4. Daily operation

①	Main source selection
	Second source selection
②	Multi-image configuration
③	Color temperature selection
	Image size selection
	Zoom factor selection

4.6.1 Main source selection

To quickly select the main source

1. While no OSD Menu is on the screen, press the Input selection key (⏏) to bring up the main source quick selection menu.
2. Toggle the available main source options by pressing the key corresponding to the desired option.
If two options are available for one key, the first key press will select the upper option, a second press selects the lower option.
The current selection is marked in red.
3. Press the stand-by key (⏻) to confirm your choice and exit the main source quick selection menu.

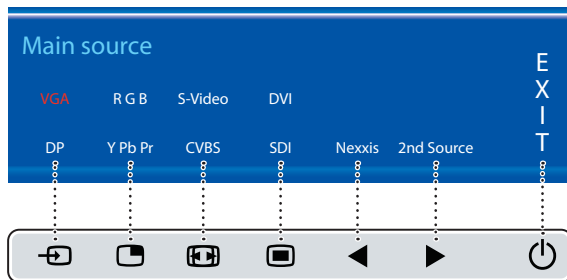


Image 4-6

Note: Available main source options dependent on display model.

4.6.2 Second source selection

To quickly select the second source

1. While no OSD Menu is on the screen, press the Input selection key (⏏) to bring up the second source quick selection menu.
2. Press the ► key to switch to the 2nd source quick selection menu.
3. Toggle the available second source options by pressing the key corresponding to the desired option.
If two options are available for one key, the first key press will select the upper option, a second press selects the lower option.
The current selection is marked in red.
4. Press the stand-by key (⏻) to confirm your choice and exit the second source quick selection menu.

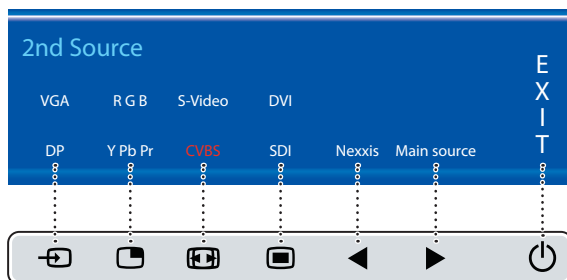




Image 4-7

Note: Available second source options dependent on display model.

4.6.3 Multi-image configuration

To quickly select the multi-image configuration

1. While no OSD Menu is on the screen, press the PiP selection key () to bring up the multi-image configuration quick selection menu.
2. Toggle the available multi-image configurations by pressing the key corresponding to the desired option. The current selection is marked in red.
3. Press the stand-by key () to confirm your choice and exit the multi-image configuration quick selection menu.

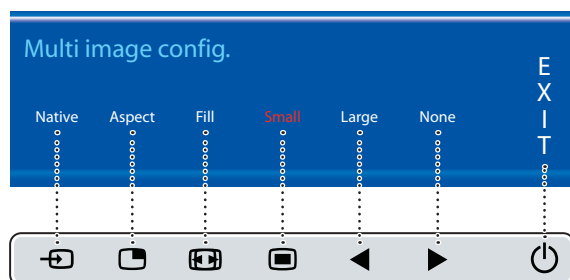




Image 4-8

4.6.4 Transfer function selection

To quickly select the transfer function

1. While no OSD Menu is on the screen, press the Image zoom key () to bring up the common functions quick selection menu.
2. Toggle the available transfer function settings by pressing the key corresponding to the desired option. The current selection is marked in red.
3. Press the stand-by key () to confirm your choice and exit the common functions quick selection menu.

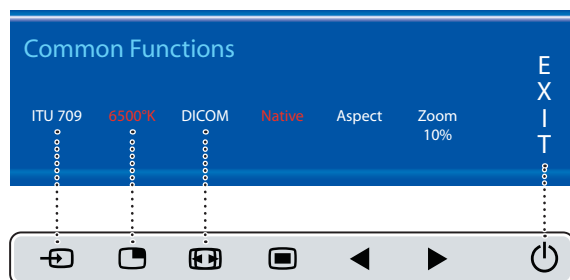




Image 4-9

Note: Only a subset of transfer function settings is available via this quick selection menu. More transfer function settings can be selected in the OSD menus.

4.6.5 Image size selection

To quickly select the image size

1. While no OSD Menu is on the screen, press the Image zoom key () to bring up the common functions quick selection menu.
2. Toggle the available image size settings by pressing the key corresponding to the desired option. The current selection is marked in red.
3. Press the stand-by key () to confirm your choice and exit the common functions quick selection menu.

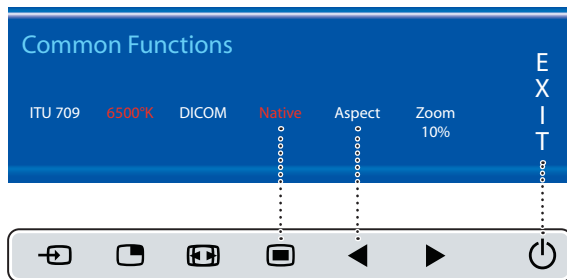


Image 4-10

Note: Only a subset of image size settings is available via this quick selection menu. More image size settings can be selected in the OSD menus.

4.6.6 Zoom factor selection

To quickly select the zoom factor

1. While no OSD Menu is on the screen, press the Image zoom key (a square with a magnifying glass) to bring up the common functions quick selection menu.
2. Toggle the available zoom factors by repeatedly pressing the ► key until the desired zoom factor is shown.
3. Press the stand-by key (a power button icon) to confirm your choice and exit the common functions quick selection menu.

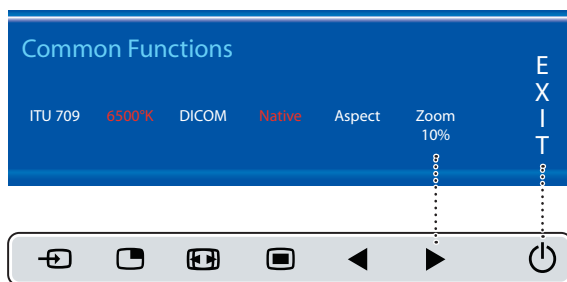


Image 4-11

4.7 Keyboard locking/unlocking

To lock/unlock the keyboard

The keyboard can be locked from the Menu to avoid unwanted access to OSD functions. When the keyboard is LOCKED only the OSD Menu key (a square with a magnifying glass) and the Stand-by key (a power button icon) are active. When the Menu OSD key is pressed the *Keyboard Locked* window appears.

1. To unlock the keyboard the following sequence of keys need to be pressed:

◀, ▶, ▶, ▶, [a square with a magnifying glass]

Each time a key is pressed an asterisk is shown in the square boxes.

After pressing the fourth key, if the sequence is correct, the main OSD menu is activated. To unlock the keyboard permanently the specific OSD function is required.

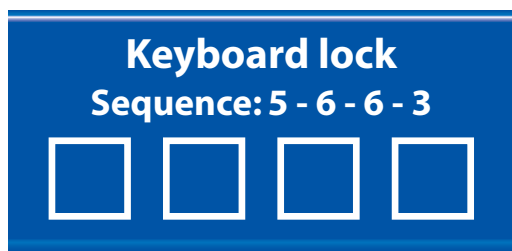


Image 4-12

5. ADVANCED OPERATION

5.1 OSD picture menu

Overview

- Profile
- Brightness
- Contrast
- Saturation
- Color temperature
- Gamma
- Sharpness

5.1.1 Profile

About profiles

To select a profile means to load a set of predefined video parameters like Brightness, Contrast, Saturation, Input selection (Primary & Secondary), Multi-image layout selection, etc.

The user can modify the default video parameters associated to each profile and save the new parameters setting under the User 1, User 2 or User 3 profile. The Factory and X Ray profiles can be temporary modified, but the factory default can't be overwritten and can always be recalled through the recall profile menu item.

The available profiles for your display are:

- Factory
- X Ray
- User 1
- User 2
- User 3

To select a profile

1. Bring up the OSD main menu.
2. Navigate to the *Picture* menu.
3. Enter the *Profile* submenu.
4. Select one of the available profiles and confirm.

5.1.2 Brightness

To adjust the brightness level

1. Bring up the OSD main menu.
2. Navigate to the *Picture* menu.
3. Enter the *Brightness* submenu.
The command bar *Brightness* is highlighted.
4. Set the brightness level as desired and confirm.



The selected brightness is maintained at a constant level by the automatic backlight stabilization function.



The brightness level can also be adjusted through a shortcut function.

5.1.3 Contrast

To adjust the contrast level

1. Bring up the OSD main menu.
2. Navigate to the *Picture* menu.
3. Enter the *Contrast* submenu.
The command bar *Contrast* is highlighted.
4. Set the contrast level as desired and confirm.

5.1.4 Saturation

To adjust the saturation level

1. Bring up the OSD main menu.
2. Navigate to the *Picture* menu.
3. Enter the *Saturation* submenu.
The command bar *Saturation* is highlighted.
4. Set the saturation level as desired and confirm.

5.1.5 Color temperature

About color temperature presets

The available color temperature presets for your display are:

- 5600K
- 6500K
- 7600K
- 9300K
- ITU 709
- Native
- User



Factory calibration – White point:

The White Color points associated with the Color Temperature: 5600K, 6500K, 7600K or 9300K are factory calibrated with a consequent reduction of the maximum luminance compared to Native Color Temperature.

**Factory calibration – Color space:**

When ITU 709 is selected, the White Color point and the RGB color primaries are adjusted according to the target HDTV / sRGB color space defined in the ITU-709 recommendation. RGB primary calibration is performed within the physical limitation of the LCD panel used.



Only in case the User preset has been selected it is possible to get access to the color regulation commands described hereafter.

To select a color temperature preset

1. Bring up the OSD main menu.
2. Navigate to the *Picture* menu.
3. Enter the *Color Temperature* submenu.
4. Select one of the available color temperature presets and confirm.

Note: If you selected the User color temperature preset, a new menu will be displayed allowing you to manually adjust the gain and offset of red, green and blue.

5.1.6 Gamma**About gamma presets**

The available gamma presets for your display are:

- CRT (Gamma 2.2)
 - Native (no correction curve is applied)
 - DICOM (grayscale levels are following closely the DICOM curve)
-

**Factory calibration – Grayscale tracking:**

When Gamma is set to “CRT” or Color Temperature preset is set to “ITU 709” mode, a Grayscale Color Tracking is implemented according to the factory calibration on different gray level.

To select a gamma preset

1. Bring up the OSD main menu.
2. Navigate to the *Picture* menu.
3. Enter the *Gamma* submenu.
4. Select one of the available gamma presets and confirm.

5.1.7 Sharpness**To adjust the sharpness level**

1. Bring up the OSD main menu.
2. Navigate to the *Picture* menu.
3. Enter the *Sharpness* submenu.
The command bar *Sharpness* is highlighted.
4. Set the sharpness level as desired and confirm.

5.2 Picture Advanced menu

Overview

- Black Level
- Smart Video
- Image Position
- Auto Adjustment
- Phase
- Clock/Line

5.2.1 Black Level

To adjust the black level

1. Bring up the OSD main menu.
2. Navigate to the *Picture advanced* menu.
3. Enter the *Black Level* submenu.
The command bar *Black Level* is highlighted.
4. Set the black level as desired and confirm.

5.2.2 Smart Video

About Smart Video

To select a Smart Video preset means to select the processing speed of video signals.

The available Smart Video presets for your display are:






- Diagnostic (best picture quality)
- Surgical (low latency)
- Surgical 1 (low latency, optimized for fast moving images)

To select a Smart Video preset

1. Bring up the OSD main menu.
2. Navigate to the *Picture advanced* menu.
3. Enter the *Smart Video* submenu.
4. Select one of the available Smart Video presets and confirm.

5.2.3 Image Position

To adjust the image position

1. Bring up the OSD main menu.
2. Navigate to the *Picture advanced* menu.
3. Enter the *Image Position* submenu.
A small OSD menu will be activated indicating the horizontal and vertical image position offset.
4. Use the  and  keys to move the picture up and down.
5. Use the  and  keys to move the picture left and right.
6. When finished, use the  key to exit from the small OSD menu.

5.2.4 Auto Adjustment



This menu item is only available when VGA input is connected.

About auto adjustment

When auto adjustment is activated, the phase and clock per line parameters are automatically adjusted.

To activate auto adjustment

1. Bring up the OSD main menu.
2. Navigate to the *Picture advanced* menu.
3. Enter the *Auto Adjustment* submenu.
The automatic picture adjustment is activated: the phase and clock per line parameters are automatically adjusted.

5.2.5 Phase

About phase

If the result of the Auto Adjustment procedure described above isn't satisfactory, the Phase can be manually adjusted by following this procedure.

To manually adjust the phase

1. Bring up the OSD main menu.
2. Navigate to the *Picture advanced* menu.
3. Enter the *Phase* submenu.
The command bar *Phase* is highlighted.
4. Set the phase as desired and confirm.

5.2.6 Clock/Line

About clock/line

If the result of the Auto Adjustment procedure described above isn't satisfactory, the Clock/Line can be manually adjusted by following this procedure.

To manually adjust the phase

1. Bring up the OSD main menu.
2. Navigate to the *Picture advanced* menu.
3. Enter the *Clock/Line* submenu.
The command bar *Clock/Line* is highlighted.
4. Set the clock/line as desired and confirm.

5.3 Display Format menu

Overview

- Main Source (Primary Source)
- Component Mode
- Zoom
- Image Size
- 2nd Picture Mode
- 2nd Picture Source
- 2nd Picture Position
- Picture Swap

5.3.1 Main Source (Primary Source)

About main sources

The available main sources for your display are:

- Auto Search
- Composite
- S-Video
- Component
- PC Analog
- DVI 1
- DVI 2
- SDI 1
- SDI 2
- Nexxis
- DisplayPort



Available main sources dependent on display model.



The main source can also be selected through a shortcut function or via the extended keyboard functionality.

To select the main source

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *Main Source* submenu.
4. Select one of the available main source and confirm.

Note: If you selected the Auto Search preset, the display will automatically detect the connected signal.

5.3.2 Component Mode

About component modes

The available component modes for your display are:

- YPbPr
- RGB

To select the component mode

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *Component Mode* submenu.
4. Select one of the available component modes and confirm.

5.3.3 Zoom

About zoom

The available zoom factors for your display are:

- None
- 10%
- 20%
- 30%
- 40%
- 50%



The zoom factor can also be selected through a shortcutkey function or via the extended keyboard functionality.

To select a zoom factor

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *Zoom* submenu.
4. Select one of the available zoom factors and confirm.

5.3.4 Image Size

About image size

The available image sizes for your display are:

- Full Screen (fill the screen, image aspect-ratio can be altered)
- Aspect (fill the screen on largest dimension, no modification in image aspect-ratio)
- Native (input pixel to LCD pixel mapping, no scaling)



In Aspect and Native, the image may be displayed with black bars on top/bottom or left/right.



The image size can also be selected via the extended keyboard functionality.

To select the image size

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *Image Size* submenu.
4. Select one of the available image sizes and confirm.

5.3.5 2nd Picture Mode

About 2nd picture modes

The available 2nd picture modes for your display are:

- Off
- Small PiP: 30% of Primary height in top-right corner
- Large PiP: 50% of Primary height in top-right corner
- Side-by-Side: Primary and Secondary input of equal height
- S.b.S. Native: The 2 images are displayed with input pixel to LCD pixel mapping, with image crop if necessary
- S.b.S. Fill: Both images scaled to fill half of the screen, with image crop if necessary



The 2nd picture mode (multi-image configuration) can also be selected via the extended keyboard functionality.

To select the 2nd picture mode

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *2nd Picture Mode* submenu.
4. Select one of the available 2nd picture modes and confirm.



Multi image in Full HD available with any combination of input sources.

Multi image in SD video available with any combination of input source except Composite & S-video.

5.3.6 2nd Picture Source

About 2nd picture sources

The available 2nd picture sources for your display are:

- Auto Search
- Composite
- S-Video
- Component
- PC Analog
- DVI 1
- DVI 2
- SDI 1
- SDI 2
- Nexxis

- DisplayPort



The 2nd picture source can also be selected via the extended keyboard functionality.



Independent Transfer Function:

Gamma and Color temperature for the 2nd Picture Source are always set to Native and 6500K independently from the Transfer Function applied to the Main Picture Source. This allows a perfect visualization of a DICOM image as Main picture and a Video image as 2nd picture.

To select the 2nd picture source

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *2nd Picture Source* submenu.
4. Select one of the available 2nd picture sources and confirm.

5.3.7 2nd Picture Position

About 2nd picture positions

The available 2nd picture positions for your display are:

- Top Right
- Top Left
- Bottom Right
- Bottom Left

To select the 2nd picture position

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *2nd Picture Position* submenu.
4. Select one of the available 2nd picture positions and confirm.

5.3.8 Picture Swap

About picture swapping

To swap pictures means to exchange (swap) main and 2nd picture.

To swap pictures

1. Bring up the OSD main menu.
2. Navigate to the *Display Format* menu.
3. Enter the *Picture Swap* submenu.
4. Select the desired setting and confirm.

5.4 Configuration menu

Overview

- Information
- Language
- Failover mode
- Extended keyboard
- OSD setting
- Recall Profile
- Save Profile

5.4.1 Information

About information

The available information items for your display are:

- Model (commercial type identification)
- Operating Hours (backlight operation hours)
- Firmware Release (firmware identification)
- Hardware Version (main board identification)
- Option SDI (SDI module identification)
- Serial Number: ANxxxxxxxxxxxx

To access information

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *Information* submenu.
The different information items are shown.

5.4.2 Language

About languages

The available languages for your display are:

- English
- Français
- Deutsch
- Español
- Italiano

To select the language

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *Language* submenu.
4. Select one of the available languages and confirm.

5.4.3 Failover mode

About failover mode

This function allows the fast switch to a defined backup source when the Main input signal is missing.

The Backup source activated is the one defined as Secondary input.

The display will automatically restore the Main input as soon as the signal is back

To enable/disable failover mode

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *Failover mode* submenu.
4. Enable/Disable failover mode as desired and confirm.

5.4.4 Extended keyboard

About the extended keyboard

The concept of the extended keyboard is to present a large selection of functions immediately available to the user without the need to navigate through the OSD Menu.

Once enabled, by simply pressing one of the first 3 keys on the left the user is presented with a list of new selections displayed on screen; the new choices can be selected by using each of the key just below the OSD text.

If two options are available for one key, the first key press will select the upper option, a second press selects the lower option.

The different available extended keyboard functions are:

- Main source selection
- Second source selection
- Multi-image configuration
- Color temperature selection
- Image size selection
- Zoom factor selection

To enable/disable the extended keyboard

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *Extended keyboard* submenu.
4. Enable/Disable the extended keyboard as desired and confirm.

5.4.5 OSD setting

5.4.5.1 OSD Horizontal Position

To adjust the OSD horizontal position

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *OSD setting* submenu.
4. Select *OSD Hor. Pos.*
The command bar *OSD Hor. Pos.* is highlighted.

5. Set the OSD horizontal position as desired and confirm.

5.4.5.2 OSD Vertical Position

To adjust the OSD vertical position

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *OSD setting* submenu.
4. Select *OSD Ver. Pos.*
The command bar *OSD Ver. Pos.* is highlighted.
5. Set the OSD vertical position as desired and confirm.

5.4.5.3 OSD Time-out

About OSD time-out

The available OSD time-out values for your display are:

- 10 Sec.
- 20 Sec.
- 30 Sec.
- 60 Sec.
- Disabled (=5 minutes)

To adjust the OSD time-out

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *OSD setting* submenu.
4. Select *OSD Time-out*
5. Select one of the available OSD time-out values and confirm.

5.4.6 Recall Profile

About recalling profiles

To recall a profile means to restore the default factory settings (Factory and X Ray profiles) or recall the use defined profiles.

The available profiles to recall from your display are:

- Factory
- X Ray
- User 1
- User 2
- User 3

To recall a profile

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *Recall Profile* submenu.

4. Select one of the available profiles to recall and confirm.

5.4.7 Save Profile

About saving profiles

The user can modify the default video parameters associated to each profile and save the new parameters setting under the User 1, User 2 or User 3 profile. The Factory and X Ray profiles can be modified, but the factory default can't be overwritten and can always be recalled through the recall profile menu item.

The available profiles to save in your display are:

- User 1
- User 2
- User 3

To save a profile

1. Bring up the OSD main menu.
2. Navigate to the *Configuration* menu.
3. Enter the *Save Profile* submenu.
4. Select one of the available profiles to save and confirm.

5.5 System menu

Overview

- Power on DVI 1
- Power on DVI 2
- DVI Output
- Keyboard lock
- Keyboard backlight
- Power Saving

5.5.1 Power on DVI 1

About power on DVI 1

This setting allows you to select the pin of DVI port 1 connector on which the +5V DC supply is applied.

The available options are:

- Disabled
- +5V on Pin 14
- +5V on Pin 16

To select the power on DVI 1

1. Bring up the OSD main menu.
2. Navigate to the *System* menu.
3. Enter the *Power on DVI 1* submenu.
4. Select one of the available options and confirm.

5.5.2 Power on DVI 2

About power on DVI 2

This setting allows you to select the pin of DVI port 2 connector on which the +5V DC supply is applied.

The available options are:

- Disabled
- +5V on Pin 14
- +5V on Pin 16

To select the power on DVI 2

1. Bring up the OSD main menu.
2. Navigate to the *System* menu.
3. Enter the *Power on DVI 2* submenu.
4. Select one of the available options and confirm.

5.5.3 DVI Output

About DVI output

This setting allows you to select which digital input to replicate on DVI out.

The available options are (depending on display version):

- DVI 1
- DVI 2
- Nexxis



This feature is subject to restrictions in case of Multi-image (PiP, SbS).

To select the DVI output

1. Bring up the OSD main menu.
2. Navigate to the *System* menu.
3. Enter the *DVI output* submenu.
4. Select one of the available options and confirm.

5.5.4 Keyboard lock

About keyboard locking

This setting allows you to disable the keyboard functionality and avoid unwanted access to the OSD functions.

Accessing the OSD menu is only possible after pressing a sequence of keys. Please refer to the dedicated section for more details (Keyboard locking/unlocking).

To enable/disable keyboard locking

1. Bring up the OSD main menu.
2. Navigate to the *System* menu.
3. Enter the *Keyboard Lock* submenu.

4. Enable/Disable keyboard locking as desired and confirm.

5.5.5 Keyboard backlight

About the keyboard backlight

By default, after lighting up, the keyboard backlight will dim again if no further actions are taken within the following 5 seconds. However, this behavior can be changed so that the keyboard backlight is always on.

To adjust the keyboard backlight

1. Bring up the OSD main menu.
2. Navigate to the *System* menu.
3. Enter the *Keyboard Backlight* submenu.
4. Select one of the available options and confirm.

5.5.6 Power Saving

About power saving

When the active input(s) is (are) missing, this setting allows the display to switch off the backlight and enter a low power mode. In this status the availability of the selected input is checked periodically.

To enable/disable power saving

1. Bring up the OSD main menu.
2. Navigate to the *System* menu.
3. Enter the *Power Saving* submenu.
4. Enable/Disable power saving as desired and confirm.

6. IMPORTANT INFORMATION

6.1 Safety information

General recommendations

Read the safety and operating instructions before operating the equipment.

Retain safety and operating instructions for future reference.

Adhere to all warnings on the equipment and in the operating instructions manual.

Follow all instructions for operation and use.

Electrical shock

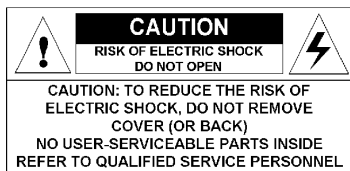


Image 6-1

Type of protection (Electrical)

Equipment with external power supply: Class I equipment

Degree of safety (Flammable anesthetic mixture)

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

Non-patient care equipment

Equipment primarily for use in a health care facility that is intended for use where contact with a patient is unlikely.

The equipment may not be used with life support equipment.

Mission critical applications

We strongly recommend there is a replacement display immediately available in mission critical applications.

Power connection

- Power requirements: The equipment must be powered using the delivered medical approved 24 VDC power supply.
- The medical approved DC power supply must be powered by the AC mains voltage (protective earth terminal).
- The equipment complies to the mentioned standards only when used with the supplied medical power supply.
- The equipment must be powered from a center-tapped electrical circuit when used in the USA at voltages above 120 Volts.
- The equipment is intended for continuous operation.
- The equipment is powered from an external power supply for class I equipment. The installer is responsible for testing the equipment's earth ground to verify that it meets the impedance requirements for the given country regulatory requirements.

6. Important information

- The equipment must be earthed by a minimum 18 AWG, maximum 6 foot (1,8m) long wire connected to the ground connection at the rear.
- The compliance of this monitor with Medical Safety and EMC requirements has been evaluated using the external (optional) Skynet medical power supply model BAR-A159. If a different power supply will be used, further investigation for Safety and EMC requirements, have to be performed at system level.

Power cords:

- Utilize a UL-listed detachable power cord, 3-wire, type SJ or equivalent, 18 AWG min., rated 300 V min., provided with a hospital-grade type plug 5-15P configuration for 120V application, or 6-15P for 240V application.
- Do not overload wall outlets and extension cords as this may result in fire or electric shock.
- Mains lead protection (U.S.: Power cord): Power cords should be routed so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs and receptacles.

Connections

Any external connection with other peripherals must follow the requirements of clause 16 of IEC60601-1 3rd ed. or Table BBB.201 of IEC 60601-1-1 for the medical electrical systems.

Water and moisture

The equipment is IP21 compliant (IPx5 front side only).



The power supply is not approved for IP21. The power supply must be mounted in a flat position for best resistance to fluids.

Ventilation

- Do not cover or block the ventilation openings in equipment.
- Heed the necessary free space around the equipment to allow enough air flow for cooling of the equipment.

Installation

- Place the equipment on a flat, solid and stable surface that can support the weight of at least 3 equipments. If you use an unstable cart or stand, the equipment may fall, causing serious injury to a child or adult, and serious damage to the equipment.
- Do not allow to climb or rest on the equipment.
- When adjusting the angle of the equipment, move it slowly so as to prevent the equipment from moving or slipping off from its stand or arm.
- When the equipment is attached to an arm, do not use the equipment as a handle or grip in order to move the equipment. Please refer to the instruction manual of the arm for instructions on how to move the arm with the equipment.
- Provide full attention to safety during installation, periodic maintenance and examination of this equipment.
- Sufficient expertise is required for installing this equipment, especially to determine the strength of the wall for withstanding the display's weight. Be sure to entrust the attachment of this equipment to the wall to licensed contractors of Barco and pay adequate attention to safety during the installation and usage.
- Barco is not liable for any damage or injury caused by mishandling or improper installation.

General warnings

- All devices and complete setup must be tested and validated before taking into operation.
- The installer needs to foresee a backup system in case the video falls away.

Technical data

- The monitor is intended for indoor use
- The monitor has been designed to be used in landscape position with a tilt of -10° (backward) and +10° (forward)
- Power consumption: 24VDC 2.5A
- Operating Temperature: 10-35°C for performance / 0-40°C for safety
- Operating Humidity: 10%-90% RH
- Operating Altitude: 3000m max.
- Storage: -20 ÷ +60°C; 10 ÷ 90%RH
- IP Protection: IP21 (IPx5 front side only), maximum tilt ±10 degree
- Class I Equipment, according to the type of protection against electric shock
- The monitor is not intended to be sterilized
- The monitor has not applied parts, but the front side of the LCD panel and the plastic enclosure have been treated as applied part because considered accidentally touchable by the patient for a time <1 minute

This apparatus conforms to:

Medical Equipment:

3rd edition:

ANSI/AAMI ES 60601-1, 3rd edition: 2005 EN 60601 3rd edition: 2006 IEC 60601-1, 3rd edition (2005)
CE (MDD) Class I, essential requirements of MDD 93/42/EEC, version 2007 (in effect as of March 2010)
CAN/CSA-C22.2 No 60601.1-08

EMC:

IEC / EN 60601-1-2: 2007

EN 55011 / CISPR11 (MDSC-2226-MNA: Class A; MDSC-2226 LED and MDSC-2226 DDI: Class B)

National Scandinavian Deviations for Cl. 1.7.2:

Finland: "Laitte on liitettävä suojamaadoitus-koskettimilla varustettuun pistorasiaan"

Norway: "Apparatet må tilkoples jordet stikkontakt"

Sweden: "Apparaten skall anslutas till jordat uttag"

6.2 Environmental information

Disposal information (Waste Electrical and Electronic Equipment)



■ This symbol on the product indicates that, under European Directive 2002/96/EC governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office, your municipal waste disposal service or the shop where you purchased the product.

Turkey RoHS compliance



Republic of Turkey: In conformity with the EEE Regulation

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

中国大陆 ROHS (Chinese Mainland RoHS)

根据中国大陆《电子信息产品污染控制管理办法》(也称为中国大陆RoHS), 以下部分列出了Barco 产品中可能包含的有毒和/或有 害物质的名称和含量。中国大陆RoHS 指令包含在中国信息产业部 MCV 标准:“ 电子信息产品中有毒物质的限量要求 ” 中。

According to the "China Administration on Control of Pollution Caused by Electronic Information Products" (Also called RoHS of Chinese Mainland), the table below lists the names and contents of toxic and/or hazardous substances that Barco's product may contain. The RoHS of Chinese Mainland is included in the MCV standard of the Ministry of Information Industry of China, in the section "Limit Requirements of toxic substances in Electronic Information Products".

零件项目(名称) Component name	有毒有害物质或元素 Hazardous substances and elements					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6+	多溴联苯 PBB	多溴二苯醚 PBDE
印制电路配件 Printed Circuit Assemblies	X	O	O	O	O	O
液晶面板 LCD panel	X	O	O	O	O	O
外接电(线)缆 External Cables	X	O	O	O	O	O
内部线路 Internal wiring	O	O	O	O	O	O
金属外壳 Metal enclosure	O	O	O	O	O	O
塑胶外壳 Plastic enclosure	O	O	O	O	O	O
散热片(器) Heatsinks	O	O	O	O	O	O
风扇 Fan	O	O	O	O	O	O
电源供应器 Power Supply Unit	X	O	O	O	O	O
文件说明书 Paper Manuals	O	O	O	O	O	O
光盘说明书 CD manual	O	O	O	O	O	O

零件项目(名称) Component name	有毒有害物质或元素 Hazardous substances and elements					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6+	多溴联苯 PBB	多溴二苯醚 PBDE
O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。 O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。 X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006						

在中国大陆销售的相应电子信息产品(EIP)都必须遵照中国大陆《电子信息产品污染控制标识要求》标准贴上环保使用期限(EFUP)标签。Barco产品所采用的EFUP标签(请参阅实例, 徽标内部的编号使用于制定产品)基于中国大陆的《电子信息产品环保使用期限通则》标准。

All Electronic Information Products (EIP) that are sold within Chinese Mainland must comply with the "Electronic Information Products Pollution Control Labeling Standard" of Chinese Mainland, marked with the Environmental Friendly Use Period (EFUP) logo. The number inside the EFUP logo that Barco uses (please refer to the photo) is based on the "Standard of Electronic Information Products Environmental Friendly Use Period" of Chinese Mainland.



Image 6-2

RoHS

Directive 2011/65/EC on the restriction of certain hazardous substances in electrical and electronic equipment.

According to what declared by our components suppliers, this product is RoHS compliant.

6.3 Biological hazard and returns

Overview

The structure and the specifications of this device as well as the materials used for manufacturing makes it easy to wipe and clean and therefore suitable to be used for various applications in hospitals and other medical environments, where procedures for frequent cleaning are specified.

However, normal use shall exclude biological contaminated environments, to prevent spreading of infections.

Therefore use of this device in such environments is at the exclusive risk of Customer. In case this device is used where potential biological contamination cannot be excluded.

Customer shall implement the decontamination process as defined in the latest edition of the ANSI/AAMI ST35 standard on each single failed Product that is returned for servicing, repair, reworking or failure investigation to Seller (or to the Authorized Service Provider). At least one adhesive yellow label shall be attached on the top site of the package of returned Product and accompanied by a declaration statement proving the Product has been successfully decontaminated.

Returned Products that are not provided with such external decontamination label, and/or whenever such declaration is missing, can be rejected by Seller (or by the Authorized Service Provider) and shipped back at Customer expenses.

6.4 Regulatory compliance information

Indications for use

This device is intended to be used in operation rooms, to display images from endoscopic cameras, room and boom cameras, ultrasound, cardiology, PACS, anesthesiology and patient information. It is not intended for diagnosis.

FCC Class B (valid for MDSC-2226 LED and MDSC-2226 DDI version)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Class A (valid for MDSC-2226 MNA version)

This equipment has been tested and found to comply with the limits of a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian notice

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

6.5 Cleaning and disinfection

Instructions

- Be sure to unplug the power cord from the mains when cleaning your LCD monitor.
- Take care not to scratch the front surface with any hard or abrasive material.
- Dust, finger marks, grease etc. can be removed with a soft damp cloth (a small amount of mild detergent can be used on the damp cloth).
- Wipe off water drop immediately.












Possible cleaning solutions

- 70 percent isopropyl alcohol
- 1.6 percent aqueous ammonia
- Cidex® (2.4 percent glutaraldehyde solution)
- Sodium hypochlorite (bleach) 10 percent
- “Green soap” (USP)
- 0.5 percent Chlorhexidine in 70 percent isopropyl alcohol.
- Like Cleansafe® optical cleaning liquid



6.6 Explanation of symbols

Overview

On the equipment or power supply, you may find the following symbols (nonrestrictive list):

	Indicates compliance to the essential requirements of the Directive 93/42/EEC
	Indicates compliance with Part 15 of the FCC rules (Class A or Class B)
	Indicates the equipment is approved according to the UL Recognition regulations
	Indicates the equipment is approved according to the UL Demko regulations
	Indicates the equipment is approved according to the CCC regulations
	Indicates the equipment is approved according to the VCCI regulations
	Indicates the USB connectors on the equipment
	Indicates the DisplayPort connectors on the equipment
	Indicates the manufacturing date
	Indicates the temperature limitations for the equipment to operate within specs
	Indicates the equipment serial no.

6. Important information

	Consult the operating instructions
	Indicates this apparatus must not be thrown in the trash but must be recycled, according to the European WEEE (Waste Electrical and Electronic Equipment) directive

6.7 Legal disclaimer

Disclaimer notice

Although every attempt has been made to achieve technical accuracy in this document, we assume no responsibility for errors that may be found. Our goal is to provide you with the most accurate and usable documentation possible; if you discover errors, please let us know.

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6.8 Technical specifications

Overview

Screen technology	TFT AM LCD
Active screen size (diagonal)	660 mm (26.0")
Active screen size (H x V)	576 x 324 mm (22.6 x 12.8")
Aspect ratio (H:V)	16:9
Resolution	2MP (1920 x 1080)
Pixel pitch	0.300 mm
Color imaging	Yes
Color support	1073 million
Viewing angle (H, V)	178°
Maximum luminance	450 cd/m ² (typical)
Contrast ratio	1400:1
Response time (Tr + Tf)	18ms
Housing color	White

Video input signals	DVI-I Single Link (digital & analog – HDMI video support with HDCP)
	DisplayPort (VESA std 1.1a)
	RGBS
	S-video
	Composite video
	Component video
	SDI/HD-SDI/3GSDI
	Nexxis fiber optic input
Video output signals	DVI
	CVBS
	S-video
	SDI
Power source requirements for external power supply (nominal)	100-250V
Power source requirements for display power input (nominal)	24VDC 2.5A
Power consumption (nominal)	LED and DDI version: 50W
	MNA version: 75W
Power save mode	Yes
Dot clock	165 MHz max. (DVI)
OSD languages	English, French, German, Spanish, Italian
Display dimensions w/o stand (W x H x D)	642 x 421 x 86 mm
Power Supply dimensions (W x H x D)	210 x 103 x 52 mm
Dimensions packaged (W x H x D)	730 x 560 x 170 mm
Net weight display w/o stand	9.8 kg (11.4 kg incl. power supply and accessories)
Net weight power supply	1.5 kg
Net weight packaged w/o stand	13.0 kg
Power supply DC output cable length	2.5 m
Mounting standard	VESA (100 mm)
Screen protection	Protective, non-reflective PMMA cover
Recommended modalities	Endoscopy, Laparoscopy, PACS, PM, US, CT, MR
Certifications	ANSI/AAMI ES 60601-1, 3rd edition: 2005 EN 60601 3rd edition: 2006 IEC 60601-1, 3rd edition (2005) CE (MDD) Class I, essential requirements of MDD 93/42/EEC, version 2007 (in effect as of March 2010) CAN/CSA-C22.2 No 60601.1-08, IEC / EN 60601-1-2: 2007, EN 55011 / CISPR11 (MDSC-2226-MNA: Class A; MDSC-2226 LED and MDSC-2226 DDI: Class B), FCC (A or B depending on model), RoHs compliant, IP21 (IPx5 front side only)
Supplied accessories	User Guide
	Video cable (DVI Dual Link)
	Mains cables (European (CEBEC/KEMA), USA (UL/CSA))
	External power supply
Optional accessories	Barco stand (K9302032A)
Warranty	3 years
Operating temperature	10-35°C for performance / 0-40°C for safety

6. Important information

Storage temperature	-20 ÷ +60°C
Operating humidity	10 ÷ 90% (non-condensing)
Storage humidity	10 ÷ 90% (non-condensing)
Operating altitude	3000 m max.
Storage altitude	12000 m max.

Dimensions

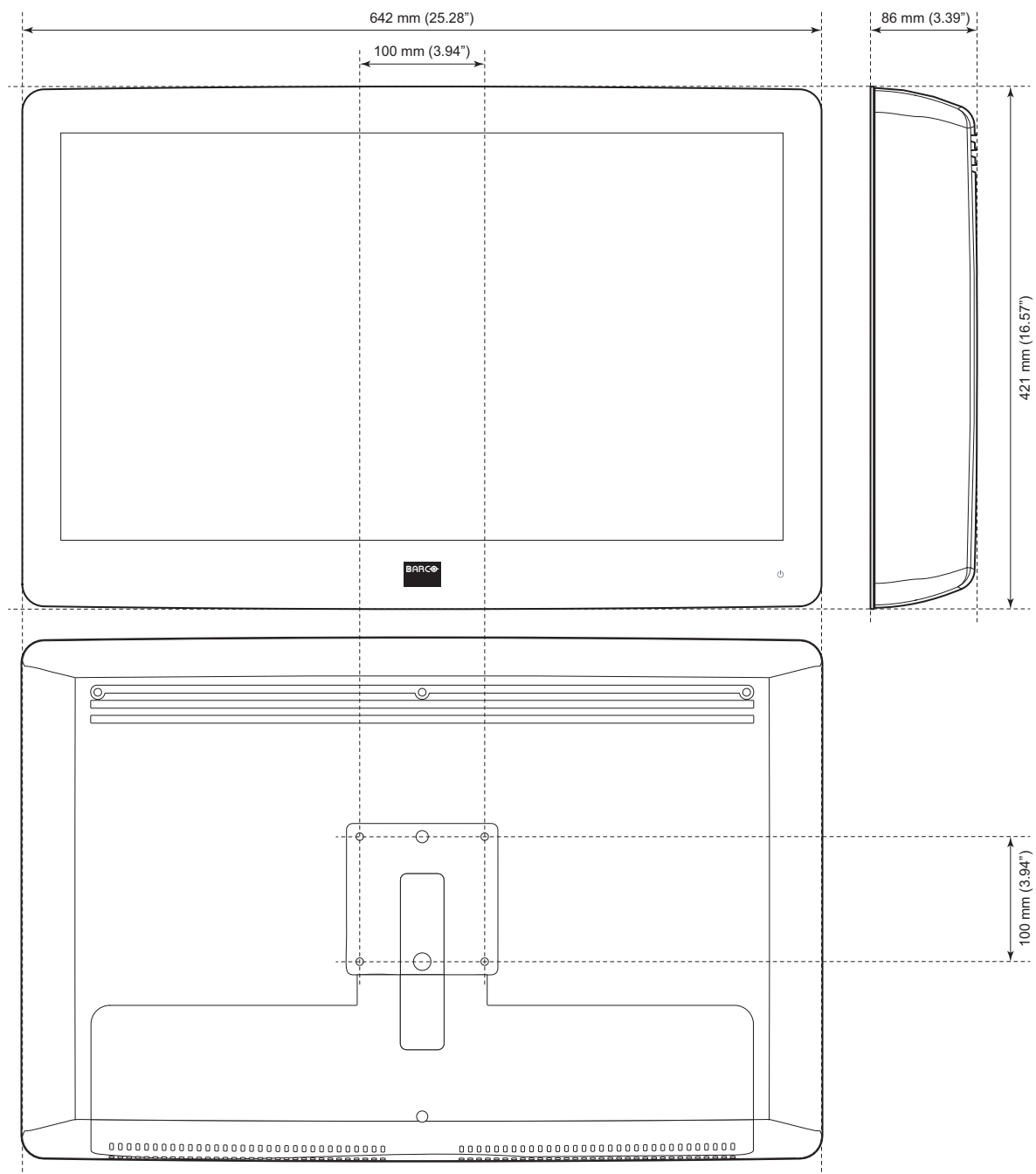


Image 6-3

6.9 Warranty statement

Barco HC General Warranty Terms and Conditions

Applicable from Jan 1st 2008

Article 1: Product warranty

Barco nv, Medical Imaging Division warrants that the equipment will be free of defects in workmanship or material for the warranty period or the specific period of a warranty extension program.

Hardware: Barco warrants that upon delivery hereunder the Products shall (i) conform to its specifications in effect at the date of delivery and (ii) be free from defects in material and workmanship (the "Warranties").

Software: Barco warrants that software written by Barco shall perform substantially in accordance with the specifications in effect at the date of delivery. Software is inherently susceptible to bugs and errors. Barco makes no warranties with respect to the software which is provided to Customer on an "as-is" basis and does not warrant uninterrupted or error-free operation of the Products.

Unless otherwise indicated in Barco's Product manual or in the agreement between Barco and Customer, the Warranty Period shall be

(a) Hardware: 12 months commencing on the Barco date of invoice.

(b) Software: 3 months commencing on the Barco date of invoice.

Notwithstanding the provisions of clause 2, repair and replacement of defects in material and/or workmanship under this warranty shall be accomplished in our works according to the terms and conditions as set forth hereafter:

1.1 Any claim under the Warranties must be notified to Barco in writing within 8 days from the date the defect or failure has been discovered or noticed the first time. The Customer, upon the occurrence of any equipment failure, shall contact Barco nv, HC customer support centre (or an authorised service centre) by telephone, fax or e-mail and shall provide the applicable customer support person with a complete description of the problem being encountered, including the model and serial number of the equipment in which the problem has arisen.

1.2 The customer support person shall diagnose the problem experienced by the Customer and shall advise the Customer on how to proceed. Customer support may ask to return the faulty equipment or faulty subassemblies to the Barco nv, or a HC customer support centre (or an authorised service centre) for repair activities. In no event shall Customer return a defective Product or part thereof to Barco without Barco's prior written approval.

In the event the return to Barco of the defective Product is authorized by Barco, Barco shall issue to Customer an RMA (Return Material Authorization).

The Customer shall apply for an RMA number to the closest Barco nv, HC Customer support centre (or an authorised service centre) as listed at www.barcomedical.com, unless otherwise indicated.

The one-way cost of packing, transport and insurance related to shipping the alleged defective Product or part to Barco for repair or replacement shall be borne by Customer. The one-way cost of packing, transport and insurance related to shipping of the repaired or replacement Product or part to Customer shall be borne by Barco.

1.3 The Customer shall return, freight prepaid, the defective equipment or subassemblies in its original packaging with the assigned RMA number for repair to the Barco nv, HC Customer support centre (or an authorised service centre).

1.4 Replacement parts used shall be new or equivalent to new parts for the revision level of the equipment. A replacement LCD panel will be new or similar run time. The warranty period for the replacement parts will expire at the same moment as the original warranty period of the equipment. All parts replaced hereunder and returned to Barco nv, HC (or an authorised service centre) shall become the property of Barco nv, HC (or the authorised service centre).

1.5 The repaired equipment shall be returned to the Customer, by regular freight, at Barco nv, HC's charge.

1.6 Barco nv, HC will replace a product that fails within 90 days after shipment from Barco with a new one, ensuring color matching in the event of a diagnostic multi head display configuration.

Barco aims to ship the new replacement product within 2 business days after receipt of the Customers notification in writing.

Article 2: Conditions precedent for warranty and items excluded from warranty

A. The Warranties shall apply only to the extent the Products or any parts thereof have

(i) been transported and stored at all times in the original packaging in the conditions as specified by Barco (such as covered and secure location, minimum and maximum temperature, maximum humidity, ...) or, in absence thereof, at least in conditions consistent with generally accepted practice for this type of products;

(ii) been handled at all times in accordance with Barco's instructions or, in absence thereof, at least with the care and caution consistent with generally accepted practice for this type of products;

(iii) been installed strictly in accordance with the instructions and directions given by Barco (if and to the extent the Products have not been installed by Barco or its authorized subcontractors);

(iv) not been subject to any unauthorized access, alteration, modification or repair or attempts thereto;

(v) been at all times "normally used" for the intended purpose and operated in strict accordance with the operating instructions set forth in the operating manual of the Product in question and shall not have been otherwise misused, abused, damaged. For the purpose hereof, "normally used" shall mean a regular, ordinary and routine usage of the Product in question as intended and/or recommended by Barco;

(vi) been maintained at all times in accordance with Barco's instructions or, in absence thereof, at least with intervals and in a manner consistent with generally accepted practice for this type of products;

B. The warranty described herein shall not include the following:

2.1 Any hardware or software item procured from a source other than Barco nv, HC or their official agent or distributor and integrated by Customer or a third party into Barco nv, HC supplied equipment.

2.2 Any host configuration not explicitly supported by Barco nv, HC.

2.3 All software installed on the system, whether they are acquired from Barco nv, HC or third party. An exception is made for software delivered by Barco nv, HC that would prove to be a cause for the mal functioning of the hardware covered under this Agreement.

2.4 Normal wear and tear, use under circumstances exceeding specifications, such as use in dusty environment or under excessive temperature conditions, abuse, unauthorised repair or alternation, lack of proper configuration or maintenance, damaged or modified or removed serial number, cosmetic refurbishment.

2.5 Repair or replacement of consumables¹ or specific parts that by definition are subject to wear and tear, including but not limited to:

a. CRT's, LCD panels

b. Backlights in diagnostic LCD displays, when the backlight run time² is beyond the Guaranteed Backlight Lifetime³ of that model, when used at the Factory Calibrated Luminance⁴

Eg1

- A display is used at 8 hours/day; ie. +/-2.920hours/year
- The display system is covered with a warranty period of 5 year
- The Guaranteed Backlight Lifetime of that model is 17.000hours.
- The Factory Calibrated Luminance cannot be achieved anymore after 4 year, thus corresponding to +/-11.680hours
- Result: the backlight replacement is performed under warranty

Eg2

- A display is used at 24 hours/day; ie. 8.760hours/year
- The display system is covered with a warranty program of 5 year
- The Guaranteed Backlight Lifetime of that model is 17.000hours.
- The Factory Calibrated Luminance cannot be achieved anymore after 2.5years, thus corresponding to +/-21.900hours
- Result: the backlight replacement does not make part of the warranty coverage.

(1): 'Consumable' is a part that can be replaced by the user

(2): 'Backlight run time' is the total time that an image (including use of a screen saver) has been applied to the screen; this value can be consulted via the OSD buttons (On Screen Display).

(3): 'Guaranteed Backlight Lifetime' is the number of backlight hours during which a predefined luminance value, ie. the Factory Calibrated Luminance, will be provided by a specific diagnostic display model. This figure is printed on the Warranty certificate of each display or can be requested at your local Barco office.

(4): 'Factory Calibrated Luminance': is the typical luminance value that a specific diagnostic display model is calibrated at during the production process. This figure is printed on the Warranty certificate of each display or can be requested at your local Barco office.

c. Lamps, optical components in projectors

d. Replacement because of:

i. image retention as a result of:

- not correctly using screen saver and/or Display Power Management System (DPMS) as explained in the user manual
- prolonged operation of the display with a static image on the same screen area

ii. a number of missing pixels that is lower than the total allowable number as mentioned in the product specifications.

iii. difference in color temperature that is lower than the total allowable difference as mentioned in the product specifications

iv. difference in color temperature as a result of not using all displays of a multi-head configuration at the same rate.

v. LCD luminance uniformity that is in within the product specifications or luminance uniformity performance that is inherent to LCD technology.

Barco nv, HC does not warrant a minimum life time nor a performance of any of the consumables.

2.6 Replacement of moveable parts such as power cords, remote controls, ...

2.7 Any product disassembly and installation costs at the operation site, travel expenses and travel time to and from the operation site for the personnel in charge of the repair works and transport charges.

2.8 Any failures resulting from an accident, negligence (such as but not limited to removing or deleting system files & licensed software product files), misuse, circuit failure or any change, damage due to fire, water, thunder or lightning, power failure or fluctuation, disruption of communication lines or due to force majeure, or any reason foreign to the equipment.

2.9 Any specific services or procedures, asked for by Customer, related to verification of repaired equipment.

2.10 The evaluation cost in case of a returned product deemed functional is not covered under warranty and will be charged to the Customer, at Barco's sole discretion, based on a case-by-case evaluation.

Article 3: Obligations of the customer

Customer hereby assumes the following obligations as partial consideration for Barco nv, HC performance of its requirements under the warranty condition; failure by Customer to meet its obligations under this paragraph shall excuse Barco nv, HC's performance hereunder:

3.1 Customer shall not expose Barco nv, HC personnel to any unsafe working conditions.

3.2 Repairs to equipment under warranty resulting from improper maintenance or repair performed by the Customer, or its officers, agents, employees, or representatives, shall be borne by the Customer at its additional cost and expense.

3.3 The Customer is responsible for installing the Barco nv, HC equipment in an environment for which it was intended. If there is an indication that the equipment was used – even temporary – outside its specifications, Barco nv, HC is entitled not to perform warranty repairs and terminate the warranty agreement. Any actions that have been taken by Barco nv, HC in this respect, may be invoiced to the Customer at normal pricing.

Article 4: Remedies under warranty

(a) Hardware: If during the Warranty Period a Product or any part thereof, fails to meet any of the Warranties then, upon Customer's request, Barco shall, at its sole option and cost, promptly and within 20 working days, either: (i) repair or correct the Product or part in question; or (ii) replace the Product or supply part(s) or component(s) according to the terms and conditions contained in article 1. A replacement part shall be at least functionally equivalent to the original part. The replaced Product, parts and/or components shall become the property of Barco and shall, at Barco's request, be returned by Customer to Barco at Barco's cost.

(b) Software: Barco's sole obligation shall be to rectify substantial malfunctions of the software (to the extent technically reasonably possible) by amending the software or supplying an alternative version of the software.

(c) The repair or replacement under the Warranties covers the cost of material and labor.

Article 5: Disclaimer of warranties

BARCO NV, HC DISCLAIMS ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Article 6: Limitation of liability

The remedies specified in these Terms and Conditions shall constitute Customer's sole and exclusive remedy and Barco's sole and exclusive liability for Barco's breach of the Warranties hereunder.

BARCO NV, HC SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO CUSTOMER OR ANY THIRD PARTY FOR DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, SUCH AS BUT NOT LIMITED TO, DAMAGE TO OR LOSS OF TANGIBLE OR INTANGIBLE PROPERTY OR EQUIPMENT, LOSS OF PROFITS OR REVENUES, COST OF CAPITAL, COST OF PURCHASE OF REPLACEMENT GOODS, OR CLAIMS OF USER FOR SERVICE INTERRUPTIONS. THE LIABILITY OF BARCO NV, HC FOR MANUFACTURING, SALE, DELIVERY, RESALE, INSTALLATION, OPERATION OR SUITABILITY FOR USE OF ANY PRODUCTS OR SERVICES COVERED BY OR FURNISHED UNDER THIS WARRANTY CONDITION, WHETHER ARISING OUT OF CONTRACT, NEGLIGENCE, STRICT TORT, WARRANTY OR OTHERWISE, SHALL NOT EXCEED THE PRICE OF THE ITEM OR ITEMS OF GOODS OR SERVICES UPON WHICH SUCH LIABILITY IS BASED.

Article 7: Force majeure

Either party shall be released from performance of its obligations under this agreement to the extent, and for so long as, the performance of this agreement is impeded by reason of force majeure. For the purposes of this clause the expression "force majeure" means, but shall not be limited to, industrial dispute, fire, mobilisation, requisition, embargo, currency transfer prohibitions, insurrection, lack of means of transport, restrictions of the use of energy, and generally any circumstances which are beyond the control of the parties and hinder performance by one party of his obligations.

Article 8 : General

8.1 Customer acknowledges its understanding that all software and electronic devices, including Barco nv, HC products are subject to possible error, mechanical or electrical failure, and should not be relied upon in inappropriate applications or without proper backup and/or other safety precautions whenever personal injury or property damage may result from failure or error of the product.

8.2 Barco nv, HC shall not be responsible for machine failure and/or its failure to render service or maintenance due to causes beyond its reasonable control.

6.10 Open source license information

Open source license information

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Linux Kernel / Libvncserver / Busybox / U-boot as well as some other components.

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LGPL 2.1 and GPL 3.1:

Qt as well as some other components.

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